Association for Information Systems
AIS Electronic Library (AISeL)

AMCIS 2007 Proceedings

Americas Conference on Information Systems (AMCIS)

December 2007

Systemic Involvement in Human Discourse: A Bi-modal Approach to IT Discourse

David Marlow
University of South Carolina - Upstate

Systemic Involvement in Human Discourse: A bi-modal approach to IT discourse

David W. Marlow
University of South Carolina – Upstate
dmarlow@uscupstate.edu

Abstract

Taking an interdisciplinary and bimodal approach to genre analysis, this paper examines the influence of an IT system on a genre of technical communication: the technical trouble ticket. This genre is examined first as an organizational practice, and then as a set of rhetorical statements; finally, the two approaches are combined and the role of the system in creating, controlling and enabling trouble tickets is discussed. Primary findings are that (1) the combination of these two approaches yields a deeper understanding than either of the approaches alone and (2) that the system, though non-rhetorical in itself, nonetheless controls, coordinates, and enables human text in trouble tickets, thereby playing a major role in the achievement of the rhetorical goals of the genre.[1]

Key words: *genre analysis, organizational communication, rhetoric, CSCW*

Introduction

Digital communication is ubiquitous today, augmenting or replacing traditional written communication in many aspects of private and professional life. Letters are being replaced with email, library stacks are being supplemented or replaced with online databases, and much paperwork is now being created digitally and backed up to both local and remote servers before being printed, copied, filed in triplicate. Although the 'paperless office' remains a myth, increasingly documents are being created, accessed and archived solely in digital environments. More and more, computers are the communication media of choice and the space in which communication media resides (Jones, 2005).

In organizations, digitalization enables new forms of communication and new models for the creation and use of documents. Employees increasingly find themselves working collaboratively with their peers toward a common goal without necessarily seeing a finished product they can call their own (Miller, 1998). While this may or may not be good for the individual, its impact on organizational communication cannot be denied. This depersonalization of work has led many researchers to expand their investigative scope beyond the individual, focusing instead on organizations as a whole and the diverse and distributed socio-technical systems that operate within them (Marti 1998). The digital text within these socio-technical systems may be referred to as IT discourse.

For the purposes of this paper, IT discourse is defined as any text that is created by, stored in and primarily accessed through technological means: specifically, software driven and hardware supported communication systems. Examples may include text messaging on cell phones, email, Internet chat rooms, Palm Pilots, digital data warehouses and, perhaps most saliently to this paper, computer supported collaborative work genres. IT discourse is of interest, not just because of its pervasiveness, but also because of its elusiveness. As Miller puts it, "technology, especially contemporary 'high technology' is everywhere, but at the same time it is rhetorically nowhere" (1998: 289). She goes on to talk about how high technology appears "inhuman, unnatural. Its ubiquity combined with its complexity and autonomy make it seem invasive" (310).

This paper looks at one genre of 'high technology' in which the system plays a major role which is both complex and largely autonomous. Upon analysis, however, it is shown that the technology involved is coordinating and enabling rather than invasive. This interdisciplinary paper is a reanalysis of a study done in from 2003-2004. It examines the technical trouble ticket: a collaborative communication genre employed in customer contact centers to communicate and archive information, enabling repair work both inside and outside the organization (Marlow, 2004). The analysis here combines an

[1] I gratefully acknowledge the assistance of Neil Ramiller and three blind reviewers in providing insights and suggestions to improve this paper.

organizational practice approach to genre systems (Yates and Orlikowski, 2002) with a linguistically based rhetorical analysis (Swales, 1990) in an attempt to locate one genre of technical communication in an understandable space from both the organizational and rhetorical perspectives.

Theoretical Approach

Caroline Miller suggests we should view IT discourse as "a rhetoric of systems… in that social actors are not so much creators of texts as the agencies through which beliefs and practices are reproduced" (Miller 1998: 309). A thorough model for examining the rhetoric in IT discourse should, therefore, account for both the influence of the computer system and the humans that generate text within it. Such a model should examine, as Truscello (2005) suggests, its transitional, cutting edge nature, its pervasiveness, and its inherent non-humanness.

This paper accepts that IT discourse is a blend of individuals' rhetorical choices and socio-technical system exigencies and attempts to capture the richness of this blending by overlaying aspects of Yates and Orlikowski's (2002) model of organizational practice analysis of a genre (socio-technical) system with Swales' (1990) analysis of rhetorical moves (individuals' choices) within a single genre.

Yates and Orlikowski's approach seeks answers to the questions Who, What, Where, Why, When and How through a combination of practice-based investigation (interviews and observation) and document analysis. In this model 'who' refers to the participants in the communication, 'what' is the content, 'where' is the location in which the participants write, 'why' refers to the purpose of the document, 'when' covers the temporal expectations and 'how' deals with the media and structuring devices (Yates and Orlikowski, 2002).

These six elements are important in understanding not only genre systems, but also the elements that make up specific IT genres within systems. This type of organizational analysis, however, fails to attend closely to the language/discourse that makes up individual documents, thereby potentially overlooking the rhetorical aspects of a genre.

Each isolated document within any genre is designed to accomplish a certain rhetorical goal or set of goals. Looking closely at the writing within these documents can help us see elements of the communication that might otherwise be overlooked. Researchers looking at genre from within the field of Linguistics have broken communication genres into subparts called 'moves'. Moves are defined as stretches of text which prototypically enact a specific rhetorical [communicative] purpose (Goffman, 1981). According to Swales (1990), communicative purpose-based moves are inherent in a genre and are both controlled and exploited by its expert users. To fully understand a specific genre, a researcher must understand these moves and how they control and shape the genre. Swales formalized this type of analysis through his examination of introductions in academic articles. He suggested that research article introductions typically consist of three moves:

- *Move 1:* Establishing a territory
- *Move 2:* Establishing a niche
- *Move 3:* Occupying the niche

Moves are typically identified by the rhetorical intent of the author, but the position of the text within a document is also taken into account; moves in most genres appear in a relatively clearly defined order. In the introduction to an academic paper, one typically first establishes a territory by discussing an issue globally, then establishes a niche by observing a gap in the existing literature, and only then occupies the niche by introducing the paper's approach to filling the gap. Since the rhetorical requirements of each genre differ, moves and move sequences must be determined independently for each genre investigated.

This rhetorical analysis of texts has been used by various researchers to examine the business letter (Bhatia, 1993), editorial responses to academic article submissions (Flowerdew and Dudley-Evans, 2002), and many other genres. The aim of such research is to access the apparent intentions and exigencies of genres by closely examining the linguistic choices of the authors. Previous studies of this type have focused primarily on text analysis supplemented by specialist informants without direct observation or analysis of the environment in which these texts were written.

This interdisciplinary approach blends the organizational lens of Yates and Orlikowski with the text analysis tactic of Swales in order more deeply explore the role of the system in coordinating and controlling the trouble ticket genre.

Trouble tickets, formally defined in the technical Request for Comments 1297 (Johnson, 1992), are the basic form of documentation used in customer contact centers. They record details of all communication, troubleshooting steps, and status changes that occur during the course of an issue under the auspices of the center. Each trouble ticket is a collection of statements entered over time, typically by multiple users but focused on a single problem in need of repair. Johnson observes that "a basic trouble ticket system acts like a hospital chart coordinating the work of multiple people who may need to work on the problem."

Trouble tickets were chosen for this analysis for the following reasons. First, tickets are entirely textual documents designed to be read independently by stakeholders both inside (engineers and management) and outside (customers) the organization. Tickets are also firmly bounded in situation, content and purpose (Yates and Orlikowski, 2002), yet are a byproduct rather than a focal point of organizational processes (Miller, 1998). Control is deliberately and aggressively assigned to the system (Miller, 1998) and the system works to limit and shape the discourse (Fuller, 2003), but the authors view their own rhetoric as unfettered and the authors comprise a clear and distinct community of practice (Swales, 1990).

Additionally, the discourse is initiated, compiled and archived within a single system (Jones, 2005). Finally, this type of interaction is quite common in the workplace [nearly 4% of the US workforce was employed in call centers in 2006 (3.7%)], but underrepresented in the literature (for exceptions see Ackerman and Halverson, 1998; Barley, 1996; Das, 2003; Marlow and Nyce, 2004; and Pentland, 1992). Only one study (Marlow and Nyce, 2004) has examined trouble ticket text in detail.

Background

The data for this study was obtained in a US-based technical customer contact center. The center has operated since the late 1980s, and at the time the data was collected served more than 150 customers and 30,000 managed sites world-wide, 7x24, 365 days per year. The center's primary function is to manage long distance data communication lines and equipment on behalf of its customers. When a problem occurs (e.g. communication to one or more locations is lost) engineers work to resolve the issue while simultaneously keeping the customer up to date on the situation. Troubleshooting involves interfacing with telecommunication carriers (telcos), field support representatives (dispatch) and customers as well remotely performing hardware/software diagnostics and repair. Engineers are equipped with a graphical display of networks and remote access to network equipment. To record and share information about the troubleshooting, engineers enter text in trouble tickets.

The study reported in this paper is based on the analysis of a corpus of 282 tickets containing over 20,000 words (all tickets opened over the course of one 24 hour day), supplemented by observation of the work environment on all shifts over the course of 18 months and by qualitative interviews with management and engineers. Management in this firm is very interested in automating the capture of information in trouble tickets and in providing detailed information about the troubleshooting process to the center's customers, making this organization's trouble tickets particularly interesting.

Organizational Practice

This section describes the trouble ticket genre using Yates and Orlikowski's (2002) organizational practice based approach to genre analysis. From this analysis we gain insight into the creation and structure of the genre and the organizational purposes this genre fulfills. In the final analysis, the questions of Who, When, and Where were not key to the focus of this study and have been excluded from this paper; see Marlow and Nyce (2004) for information on these aspects of trouble tickets in action.

How: Media and structuring devices

The trouble tickets in this study are created, updated, and stored using the Clarify® Customer Relationship Management software system. This system allows tickets to be opened and updated by automated tools, contact center personnel, customers, dispatch operators, and external partners. This system also allows tickets to be made available on the Internet. Reports are generated by a separate system and integrated into the customers' Web portals.[2]

The contact center has a complex set of tools to support and guide engineers. Communication devices managed by the call center are linked to the center's system and are programmed to provide status on both their own communication status and that of other devices connected to them. This information is fed into monitoring software that provides textual alerts, as well as graphical displays, and passes along information, translating it into data automatically inserted into tickets seamlessly interwoven with engineers' inputted text. Additionally, the system interprets this information and automates the most common tasks of opening[3] and closing[4] tickets as well as documenting system outages and restorals.[5] The trouble ticket system also monitors all open tickets and issues notifications to call center staff when a ticket reflecting a loss of communication has not been updated within a pre-specified period of time. Contact Center management has integrated these modifications to ease the burden of repetitious tasks, reduce human error, and expedite the troubleshooting process. In this way the system coordinates and manages the engineers' repair work.

The system also enables three different enhancements to stakeholder communication: email, fill-in forms, and inter-organizational entry exchange between trouble ticket systems. Any user can send an email to another party through the customer management system. The email is simultaneously sent to the addressee and recorded in the trouble ticket. An example is provided in excerpt (1) below.

[2] These reports are part of the overall genre system, but are beyond the scope of this study of the single genre of trouble tickets.
[3] In the current sample, 261 of 282 tickets were opened by the system.
[4] The system will close only tickets with no human input. Ninety-six tickets were closed by the system in this sample.
[5] The term 'restoral' is used by practitioners in this organization to refer to the restoration of communication.

```
1) Store 309 is down and a trouble ticket with Telco-A has been created.  We will
   update you shortly with the test results.  Please contact me with any questions
   or concerns.

   Thank you,
   Jennifer Hebby
   Contact-Center-Svs
```

The use of email from within the system is rare, with only six instances in the sample for this study. Engineers typically prefer to use the Outlook® client from their desktops supplemented by a line in the tkt documenting that email was sent [see (3) below]. Engineers report that they use the ticket system's email only when proof of the communication is essential.

Fill-in forms appear when an engineer indicates that an external partner needs to take action to resolve a problem. These forms prompt the user to fill in specific information so that all required information is included. This information is then forwarded to the partner for action and simultaneously recorded in the ticket. Contact Center Management reports that the use of these forms helps to ensure all the necessary information is conveyed the first time reducing confusion, thereby saving time and money. The final form of ticket enhancement is the direct exchange of entries from one system's trouble tickets to another. This type of exchange happens only between the call center, the dispatch center, and one telecommunications carrier partner, and can originate from the contact center (2) or from the partners' centers (3). The response from the partner utilizes a form which is automatically populated except for the final line, which was typed by a person.

```
2) Notes: Circuit is down, Please test.
```

```
3) Ckt ID: AREC123456   ATI
   Svc. Class: Domestic Frame Relay
   TroubleCode: DWN
   OutageCond: Total outage
   Ticket State: 2
   MCN: KV1234
   Notes: Circuit is down, Please test.
   Addnl Notes: lcheskir
   Time: 2003-05-30T08:40:16
   TELCO-B HAS PRE-ASSIGNED A TECHNICIAN TO WORK FIELD TROUBLE
```

Automating this type of communication not only reduces error, but also saves time as an engineer may be forced to wait on hold for an hour or more when placing a telephone call to the telco partner's contact center. In the sample collected for this study, there were 27 messages sent from the contact center to telco and 37 messages returned.

What: Content and Format

Trouble tickets are available in real time to a large group of stakeholders including contact center engineers and management, customers, field service representatives, and one key telecommunication partner. Tickets are also stored for archival use and remain available to customers and contact center personnel after they are closed. Approximately 15,000 tickets are created in the contact center every month.

Trouble tickets have a standard format beginning with system supplied identification (ticket number, customer name, site affected, status, customer contact, an initial assessment of the problem, and a date/time stamp) which is automatically inserted into the top of a ticket upon creation. This is followed by a series of discrete entries, automatically generated by the system or made by different people at various times.[6] Each individual entry is marked with a header that includes a time/date stamp and uniquely identifies the author.

```
4) *** NOTES AND STATUS CHANGE  30-May-2003 12:25:19 Eastern Daylight Time
   Brown_Joan Action Type: Other[7]
   See the link back up.  Accessed the Telco_A web ticket and requested the RFO.[8]
```

All headers are generated by the system. As introduced above, entire entries may also be inserted into the ticket without human intervention. These automated entries mark the failure (5) and restoral (6) of communication:

```
5) *** NOTES 30-May-2003 11:27:01 Eastern Daylight Time Server_ATGA
   FRI-2004s73 - LINK DOWN
```

```
6) *** NOTES 30-May-2003 12:35:49 Eastern Daylight Time Server_ATGA
   FRI-2004s73 - LINK UP
```

Over half of the trouble ticket text in the sample for this study is automated, making the influence of the system on human generated text particularly interesting.

[6] An annotated sample ticket is provided in the Appendix.
[7] Headers are highlighted here and throughout to distinguish them from entry text.
[8] RFO = Reason for outage

Why: Purpose

The primary purposes of trouble tickets are to track a problem or unusual situation and to facilitate communication while an issue is being investigated Any engineer reading a ticket must be able quickly assess what has happened and what needs to happen next. This is critical as it allows any technician on any shift to field phone calls from any customer. Without up-to-date information available to all engineers, customers would be forced to hold until a technician assigned to their network was available to speak with them directly. Careful attention to ticket updates is also a manner for engineers to protect themselves and the call center against possible future claims of misconduct in the resolution of a comminciation outage In this way, the trouble ticket system enables repair work to be coordinated between individuals and across different work shifts.

Rhetorical Moves Analysis

This section follows Swale's model of genre analysis to examine trouble tickets as a set of rhetorical moves which enact authors' communicative purposes. Examining trouble ticket text as rhetorical sets sheds a different light on how users view the communicative situation than was seem in the organizational practice analysis.

As discussed in the *What* section above, trouble tickets are composed of individual entries. Each human-generated entry contains one or more moves. If there are two or more stretches of text with clearly distinct rhetorical intentions in a single entry, each stretch of text is considered an individual move.

Moves in trouble tickets may be instantiated in several ways. Text may be typed into the ticket, the system's email option may be employed, responses may be provided to a fill-in form, or information may be pasted into a ticket from another source. Text that is generated by another system and then pasted into a ticket is classified as a move, since a person made the decision to include the information. Because the actual text was generated by an IT system, howver, these moves may be considered a blend of human intention and system exigency. Headers and entries automatically entered into the trouble ticket by the system, however, are not considered moves because no rhetorical exigency can be assigned to the automated system.

Six major categories of rhetorical purpose were labeled as moves in trouble tickets:

- *Open* *Initiates a ticket with identifying information and statement of the problem*
- *Status* *Captures information about troubleshooting or the current state of communication*
- *Request* *Communicates a request*
- *Archive* *Archives information that serves no direct purpose in the repair process*
- *Resolution* *Singles out the primary cause of the original communication failure*
- *Close* *Concludes a ticket with summary of the problem.*

With the exceptions of Open and Close, trouble ticket moves do not have a specified order, though *Resolution* tends to be the penultimate entry. The other three moves appear freely in any medial position.

Open moves are distinguished from other moves by their position at the top of a ticket. They typically indicate the current state of communication as in (7) and (8), and would be considered *Status* moves if they came later in the ticket.

7) Link Down

8) Large Amount Of BGP Routes[9] Being Learned and Withdrawn

Status moves may be also instantiated by information copied directly from the communication device, another company's trouble ticket system (9) or through a fill-in form (10).

9) 05/30/2003,13:06:40 [bmp43][PROG][PROGRESS/STATUS MESSAGE FROM AT&T]
your ck is down due to a fiber cut and we have escalated with the lec.

10) Old ETA: 30-MAY-2003 14:27:17 New ETA: 30-MAY-2003 18:30:00

Requests can be made of other engineers (11) or of an outside stakeholder (12). In the case of a request being made outside the contact center, it is the entry header which required identifies of whom the request is made.

11) *** NOTES 03-Jun-2003 15:39:00 Eastern Standard Time [Site Time: 03-Jun-2003 15:39:00 EST] Ribby_Mist Action Type: Other
*******PLEASE DO NOT LET AT&T CLOSE THIS TICKET WITHOUT TALKING TO ME FIRST*****************

12) *** CASE SENT to TELCO 30-May-2003 10:01:34 [Site Time: 30-MAY-2003 09:01:34 CST] TELCO Notes:
Circuit is down, Please test.

Archive moves are unique in that they do not further the repair process. They are used to invoke authority for an action (13), record that an appropriate action is being completed (14), or email a customer through the system [see (1) above].

13) Serge[10]\CCS reports site has closed...Sent email to have site removed from manager

[9] "BGP Routes" refers to communication protocol processes driven by software in communication devices

14) working tkt[11]

Resolution moves attempt to isolate the primary cause of the outage, though the cause may not always be evident as shown in (15). Pasting information from the communication device itself (16) is also common and is viewed by engineers as more authentic or trustworthy than typed text because the device log can be used to certify the entry.

15) circuit cleared while lec was testing

16) Last power up or reset: 30-MAY-2003 09:54:20

Close is distinguished from *Resolution* only in the position. In fact, the closing entry is often simply a repeat of the *Resolution*. Like *Status*, both *Resolution* and *Close* may be instantiated by pasting information from the router into a ticket entry, again lending authenticity to the move.

Trouble tickets differ from other, more traditional communication genres studied using a rhetorical moves analysis in at least two key ways. First, only *Open* and *Close* have any specific mandatory position in a trouble ticket; *Resolution* strongly tends to appear toward the end of the ticket, but an unexpected re-occurrence of a problem may restart the troubleshooting process, leaving a *Resolution* move in a medial position. The other three moves may be found in any order; in any case, no human effort is given to coordination of the ticket discourse. Second, trouble ticket discourse is collaboratively concatenative in nature [different individuals build on one another's work, but at different times] and there is little attention paid to cohesion, rather updates are made based on the need of the moment with little regard to what has come before.

Discussion

Both the organizational practice and rhetorical moves analyses provide interesting information in the examination of the trouble ticket genre. Through the organizational practice lens, we see that the system plays a major role in enabling trouble ticket discourse and, by extension, the engineers' repair work. In the case of the fill-in form, the system also serves to limit the choices engineers make in entering information into tickets. This systemic involvement enables a high density of specific information regarding outages, reduces errors, and saves time, all of which leads to precision in troubleshooting and expedited resolution. The rhetorical moves approach strengthens the findings of the first method by highlighting the absence of human intention in the organization of trouble ticket discourse; the actual coordination of the discourse within the trouble tickets falls to the non-rhetorical system. The system organizes ticket information in such a way that any engineer on any shift, in any part of the contact center, should be able to determine what needs to be done after a brief review of the latest entries. Unless an issue is particularly sensitive or problematic, there is very little communication on specific technical issues between engineers on adjacent shifts.

Putting the two lenses together, we see the impact of the system in a way that might not be evident through one analysis alone. Although one of the fundamental premises of the rhetorical moves analysis is that a move is instantiated through the rhetorical purpose of an author, we can see in trouble tickets that four of the six human moves (*Open, Status, Resolution,* and *Close*) may also be accomplished by the non-rhetorical system. Furthermore, five of moves may be instantiated through a blend of human and system text by pasting information into a ticket which has been generated in an IT system. Table 1 illustrates the distribution of text types in the moves identified in this study. The 'System' column is shaded because, inspite of the fact that it accomplishes the same purpose as a human engineer's intention, the system cannot be said to have the rhetorical intention required to instantiate a move.

Table 1: Move Types and Instantiations

Move Types	Human	Blend	System
Open	x		x
Status	x	x	x
Request	x	x	
Archive	x	x	
Resolution	x	x	x
Close	x	x	x

Furthermover, though the system itself is non-rhetorical, trouble ticket users treat system entries as a natural part of trouble ticket discourse, making no distinction between human entries and system entries. Table 2 illustrates how users build upon system generated text. The following paragraphs examine in detail an excerpt, shown in Table 2, from the full ticket provided in the Appendix. In the text preceding the excerpt, the ticket is automatically generated, then populated with one human and three system entries. The human entry mentions that a ticket has been opened with telco – a point which will be important in our discussion below.

In entry (A) of Table 2 an engineer declares that the problem the ticket was opened for has been resolved: there was a power outage, but the system restored when the electricity came back on. While there is no overt cohesion here, in making his entry without noting overtly that communication has been restored, he seamlessly builds on the previous system entry.

The next two system entries (B & C) show that the site loses communication again, albeit for less than two minutes. The third engineer to participate in the ticket integrates the information provided in (A) – (C) reinforcing the *Resolution* in (A) with text copied from the device and noting that (B) and (C) were caused by the telecommunications carrier testing the communication line, though like the author before him, he makes no overt reference to any prior entry in the ticket. Most

[10] The call center manager
[11] tkt = ticket

importantly, there is no distinction between the manner in which user entries and system entries are treated. Both types are simply pieces of the puzzle which must be put together in doing the repair work.

Here the line between human rhetoric and system exigency is blurred just as the instantiation of a move may be blended. In short, system text is distinguishable from human text primarily through ticket headers, not through analysis of the text itself, and human engineers take advantage of the perceived authority and authenticity inherent in system generated text by simulating it [at least some of the time] in their own entries.

Table 2: Trouble Ticket Excerpt

`*** PHONE LOG AND STATUS CHANGE 30-May-2003 10:07:34 Eastern Standard Time [ Site Time: 30-May-2003 09:07:34 CST] Smith_Larry Action Type: Outgoing call power restored..... emaield GP.`	**(A)** **User – Entry:** ← *Resolution* – Power loss caused the outage ← *Archive* – informed the customer again
`*** NOTES 30-May-2003 10:57:27 Eastern Standard Time [ Site Time: 30-May-2003 09:57:27 CST] Server_ATGA FRI-3013s76 - LINK DOWN,s43`	**(B)** **System Entry:** *'Status'* – Communication was lost
`*** NOTES 30-May-2003 10:59:13 Eastern Standard Time [ Site Time: 30-May-2003 09:59:13 CST] Server_ATGA FRI-3013s76 - LINK UP`	**(C)** **System Entry:** *'Status'* – Communication was restored
`*** CASE CLOSE 30-May-2003 11:40:42 Eastern Standard Time [ Site Time: 30-May-2003 10:40:42 CST] Andes_Jon NODE RESET DUE TO POWER-UP OR RESET SWITCH following ckt bounce due to telco testing... their TT closed now...`	**(D)** **User – Entry:** ← *Close* – restates the *Resolution* using text pasted from the device

Findings

The degree to which human and system generated text is interleaved in trouble tickets is, perhaps, unmatched in the existing literature. Similarly compelling is the extent to which the system coordinates and manages the genre. The system opens, updates, and closes tickets, guides information recorded through fill-in forms, facilitates communication between stakeholders through ticket exchange and email and even alerts engineers (and managers) about tickets that go untouched for too long.

Engineers treat system generated entries just as they treat the entries of other engineers, seamlessly integrating the two in their repair work. Moreover, these engineers are not only willing to use system generated information, but view it as superior to human generated text in terms of authenticity and reliability. The trouble ticket genre is one in which the system extends beyond the normal confines of a communication medium or information repository; the system is an active participant in enabling the repair work of the technical contact center and system generated text is effectively indistinguishable from some of the human text.

Future Study

This study points to recommendations for future study in three areas. First, the trouble ticket is a widely used, but under-studied genre of organizational communication that deserves more attention. Second, the non-rhetorical system plays a major role in the trouble ticket genre. This area of investigation can, and should, be extended to other genres to explore the roles of systems, and the potential for exploiting those roles, in other communication environments (e.g. digital hospital records and air traffic control flight strips). Finally, the use of both the organizational and rhetorical lenses to explore genre should fine-tuned and applied to other genres.

Conclusion

This paper has shown that, while both the Organizational Practice approach of Yates and Orlikowski (2002) and the Rhetorical Moves Analysis of Swales (1990) have value in and of themselves, bringing both lenses to bear on a single genre can illuminate aspects of communication that either approach might miss if used alone. In this case, the two analysis techniques together extracted detailed information about system involvement in the trouble ticket genre, enabling us to see that the system plays a very significant role in organizing, controlling ticket text and thereby enabling repair work in a technical organization.

References

3.7% of US Workforce Employed in Call Centers. *Call Center.* (19:9) 2006. p12.

Ackerman, M. S. & Halverson, C.. Considering an Organization's Memory. in Computer Supported Collaborative Work. Seattle, WA: ACM Press. 1998. pp. 39-48.

Barley, S.R. Technicians in the workplace: ethnographic evidence for bringing work into organization studies. Administrative Science Quarterly (41). 1996. pp. 404–441.

Bhatia, V. K. *Analysing genre: language use in professional settings*. London: Longman. 1993.

Das, A.. Knowledge and productivity in technical support work. Management Science (49:4). 2003. pp.416–431.

Flowerdew, J. and Dudley-Evans, T. Genre analysis of editorial letters to international journal contributors. *Applied Linguistics*. (23:4). 2002. pp. 463-489.

Goffman, E. *Forms of Talk.* Philadelphia: University of Pennsylvania Press. 1981.

Johnson, D. "RFC 1297", Online Document: http://www.ietf.org/rfc/rfc1297.txt. 1992. Accessed March 5, 2007.

Jones, S. L. From Writers to Information Coordinators: Technology and the Changing Face of Collaboration. Journal of Business and Technical Communication. (19:4). 2005. pp. 449-467.

Marlow, D.W. *Writing Under the Gun: A multimodal analysis of technical trouble tickets as an IText genre.* Unpublished dissertation. Ball State University. 2004.

Marlow, D.W. and Nyce. "Speak now and forever record your piece: Information use in technical trouble tickets." in the *Proceedings of the Annual Meeting of the American Association for Information Science and Technology.* 2004. pp. 427-436.

J.M. Marti. P. "Structured task analysis in complex domains." *Ergonomics* (41:11). 1998. pp. 1664-1677.

Miller, C. R. "Learning from History: World War II and the Culture of High Technology." *JBTC* (12:3). 1998. pp. 288-315.

Pentland, B.T. "Organizing Moves in Software Support Hot Lines." Administrative Science Quarterly. (37). 1992. pp. 527-548.

Swales, J.M. *Genre Analysis: English in academic and research settings.* Cambridge: Cambridge University Press. 1990.

Yates J. and Orlikowski, W.J. "Genre Systems: Structuring interaction through communicative norms." Journal of Business Communication. (39:1): 2002. pp.31-35.

Appendix: Annotated Trouble Ticket

Ticket Number 0000123456 Customer: XYZ-Financial Site: s12345 Status: Hard-down Severity: Medium Contact: Gerald Prince Problem: Interface DOWN Date: 02/04/03 12:34:50	**Ticket Header:** System generated fields
*** NOTES 30-May-2003 09:37:34 Eastern Standard Time [Site Time: 30-May-2003 08:37:34 CST] Server_ATGA FRI-3013s76 - LINK DOWN	**System Entry:** ← 'Status' – Communication was lost
*** PHONE LOG 30-May-2003 09:45:23 Eastern Standard Time [Site Time: 30-May-2003 08:45:23 CST] Kerry_Harold Action Type: Outgoing call s5 was down (A0012110)..... emailed GP.... opened TELCO-A ticket 353001407....	**User – Entry:** ← Status – clarifies the entry above ← Archive – emailed the customer ← Status – provides troubleshooting info
*** NOTES 30-May-2003 09:38:37 Eastern Standard Time [Site Time: 30-May-2003 08:48:37 CST] Server_ATGA FRI-3013s76 - LINK UP	**System Entry:** ← 'Status' – Communication was lost
*** PHONE LOG AND STATUS CHANGE 30-May-2003 10:07:34 Eastern Standard Time [Site Time: 30-May-2003 09:07:34 CST] Smith_Larry Action Type: Outgoing call power restored...... emaield GP.	**User – Entry:** ← Resolution – identifies original problem ← Archive – emailed the customer again
*** NOTES 30-May-2003 10:57:27 Eastern Standard Time [Site Time: 30-May-2003 09:57:27 CST] Server_ATGA FRI-3013s76 - LINK DOWN,s43	**System Entry:** ← 'Status' – Communication was lost
*** NOTES 30-May-2003 10:59:13 Eastern Standard Time [Site Time: 30-May-2003 09:59:13 CST] Server_ATGA FRI-3013s76 - LINK UP	**System Entry:** ← 'Status' – Communication was restored
*** CASE CLOSE 30-May-2003 11:40:42 Eastern Standard Time [Site Time: 30-May-2003 10:40:42 CST] Andes_Jon NODE RESET DUE TO POWER-UP OR RESET SWITCH following ckt bounce due to telco testing... their TT closed now...	**User – Entry:** ← *Close* – restates the *Resolution* using text pasted from the device – clarifies the entry above – telco will not test again; their ticket is now closed